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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/540,967	10/20/2005	John Barry Fitzgerald	57.0533 US PCT	6100

37003 7590 09/26/2007
SCHLUMBERGER-DOLL RESEARCH
ATTN: INTELLECTUAL PROPERTY LAW DEPARTMENT
P.O. BOX 425045
CAMBRIDGE, MA 02142

EXAMINER

SUNG, CHRISTINE

ART UNIT	PAPER NUMBER
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2884

MAIL DATE	DELIVERY MODE
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09/26/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/540,967

Applicant(s)

FITZGERALD, JOHN BARRY

Examiner

Christine Sung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7-10 and 12-17 is/are rejected.
- 7) ☒ Claim(s) 5, 6 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 1005.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 8-10, 12-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa (US Patent 5,166,964 A) in view of Farren (US Patent 4,667,515).

Regarding claim 1, Hasegawa discloses a method of monitoring a sample, the method comprising:

providing a sample holder (figure 10, element 14) having

a photon detector (element 12-1) at a first position on the periphery of said sample (element 12-1 is on the surface of the sample, element 14),

a first photon source (element 10-2) at a second position on the periphery of said sample (element 10-2 is positioned at a different location than the detector, element 12-1), said detector and first source defining a first chord across said pipe, and

one or more additional photon sources (elements 10-1) at positions on the periphery of said sample defining one or more additional chords across said sample (see figure 10, element 10-1 emits radiation that is detected by element 12-1, thus they define different additional chords across the sample);

determining the density across said first chord from the count rate detected from the first source by the detector (column 7, lines 47-51); and

determining the densities across said one or more additional chords from the count rate detected from the one or more additional sources by the detector (see column 7, lines 47-51, multiple density measurements are taken by each detector), wherein the additional chords are chosen to have successively decreasing length across said pipe relative to said first chord (element 10-2 is further away from the detector element 12-1 than element 10-1).

Hasegawa does not specify monitoring the flow of a pipeline, but only discloses a general inspection of a sample. However, Farren discloses a pipeline inspection apparatus that measures the density across various chords of the pipeline (see figure 5). Thus Farren discloses the specific application and configuration of detecting density in a pipeline. It would have been obvious to one having ordinary skill in the art at the time then invention was made to have applied the specific pipeline configuration disclosed by Farren to the general density method as disclosed by Hasegawa in order to accurately detect flow patterns within the pipeline.

Regarding claim 2, Farren discloses that the first source (figure 5, element 14) is diametrically opposite the detector (element 16).

Regarding claim 3, Hasegawa does not specify the particular phase of the material to be inspected, however he also does not limit the type of material that is in the sample, and allows detection of density of all types of materials. Further, Hasegawa disclose density measurements across several chords (see figure 10, element L1, for example) which determine the material present in the sample, i.e. higher density = solid, vs. lower density = gas/liquid. Thus, since Hasegawa discloses measuring relative densities (See column 7, lines 47-51) it would have been

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obvious to one having ordinary skill in the art at the time the invention was made to have determined the presence of a solid based upon the detected density as such a determination is merely a categorization of the density measurement taken by Hasegawa.

Regarding claim 4, Hasegawa discloses that the flow is a mixed flow comprising at least two phases including a solid phase, said method further comprising:

determining the average phase fraction of solid in the pipe from the densities across said first chord and said one or more additional chords. (Applicant discloses that average phase fraction may be determined from the relative densities across said first chord and said one or more additional chords. Based on this definition, Hasegawa discloses averaging or comparing densities, across a first and second chord (see column 7, lines 47-51, multiple density measurements are taken by each detector)).

Regarding claim 8, Farren discloses that the detector (element 16) is positioned at the uppermost point on the periphery of the pipe and the first source (element 14) is positioned at the bottommost point on the periphery of the pipe (see figure 5).

Regarding claim 9, Hasegawa teaches a detection system employing 3 sources and a detector (see figure 10), but does not specify the claimed configuration of such elements. However, Farren discloses the configuration of placing the detection/source elements around the exterior of the pipeline. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have arranged the elements as disclosed by Hasegawa in the configuration as disclosed by Farren in order to accurately determine the flow pattern of a pipeline (see Farren, column 1, lines 23-26).

Regarding claim 10, Hasegawa discloses that the one or more additional sources (figure 10, elements 10-1 and 10-3) comprise one or more pairs of identical gamma ray sources (elements 10-1, 10-2 and 10-3 are identical sources), each said pair of sources being positioned on the periphery of the pipe such that the chords across the pipe defined by each member of the pair with the detector are approximately of equal length (the chord formed by elements 10-2 and 10-3 are identical), the average hold-up being determined from the average value of the densities across said chords (column 7, lines 49-51).

Regarding claim 12, Hasegawa discloses that the photon detector is a gamma ray detector (see abstract and element 12-1 is a gamma ray detector).

Regarding claim 13, Hasegawa discloses that the first and the one or more additional sources are positioned on the periphery of the pipe successively closer to the detector (see figure 10, source 10-1 is closer to the detector than 10-2).

Regarding claims 14-16, Hasegawa discloses an apparatus for monitoring flow in a sample comprising;

- a photon detector (element 12-1) adapted for attachment at a first point on the periphery of said sample (see figure 10);

- a first photon source (element 10-2) adapted for attachment at the periphery of said sample opposite the detector (see figure 10), said detector and first source defining a first chord across said sample;

- one or more additional photon sources (element 10-1) adapted for attachment at positions on the periphery of said sample successively closer to the detector (see figure 10, element 10-1 is

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closer to the detector than element 10-2), said detector and one or more additional sources defining one or more additional chords across said pipe; and

a processor adapted to determine the densities across said first and one or more additional chords of the sample as a function of the count rate detected by the detector from the first and one or more additional sources, respectively (column 7, lines 47-51).

Hasegawa does not specify monitoring the flow of a pipeline, but only discloses a general inspection of a sample. However, Farren discloses a pipeline inspection apparatus that measures the density across various chords of the pipeline (see figure 5). Thus Farren discloses the specific application and configuration of detecting density in a pipeline. It would have been obvious to one having ordinary skill in the art at the time then invention was made to have applied the specific pipeline configuration disclosed by Farren to the general density method as disclosed by Hasegawa in order to accurately detect flow patterns within the pipeline.

Regarding claim 17, Hasegawa discloses a method of monitoring flow in a sample comprising:

providing a sample having:

a photon detector (element 12-1) at a first position on the periphery of said sample (see figure 10),

a first photon source (element 10-1) at a second position on the periphery of said sample (see figure 10), said detector and first source defining a first chord (element L1) across said sample, and

one or more additional photon sources (elements 10-2 and 10-3) at positions on the periphery of said sample defining one or more additional chords across said pipe;

determining the density across said first chord from the count rate detected from the first source by the detector (column 7, lines 47-51); and

determining the densities across said one or more additional chords from the count rate detected from the one or more additional sources by the detector, wherein the additional chords are chosen to have successively decreasing length across said sample relative to said first chord (see column 7, lines 47-51).

Hasegawa does not specify monitoring the flow of a pipeline, but only discloses a general inspection of a sample. However, Farren discloses a pipeline inspection apparatus that measures the density across various chords of the pipeline (see figure 5). Thus Farren discloses the specific application and configuration of detecting density in a pipeline. It would have been obvious to one having ordinary skill in the art at the time then invention was made to have applied the specific pipeline configuration disclosed by Farren to the general density method as disclosed by Hasegawa in order to accurately detect flow patterns within the pipeline.

3. Claim 7 rejected under 35 U.S.C. 103(a) as being unpatentable over Hasegawa (US Patent 5,166,964 A) in view of Farren (US Patent 4,667,515) further in view of Kehler (US Patent 3,846, 631).

Regarding claim 7, Hasegawa discloses that the photon sources are active gamma ray sources. However, chemical isotope sources are well-known gamma sources as disclosed by Kehler (see column 5, lines 54-57). Thus it would have been obvious to one having ordinary skill

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in the art at the time the invention was made to use the conventional isotope gamma source disclosed by Kehler with the invention as disclosed by Hasegawa in view of Farren as selection of the chemical isotope is a known equivalent to the active gamma source disclosed by Hasegawa and thus would be within the level of ordinary skill in the art.

Allowable Subject Matter

4. Claims 5-6 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 5-6, none of the prior art of record specifies or makes obvious a method of monitoring a flow pipe, namely the step of providing plurality of sources that are of different photon energies, in combination with the other claimed steps. References such as Hasegawa and Farren disclose methods of determining density using a plurality of sources of the same photon energy but do not disclose or suggest providing a plurality of sources of different energies.

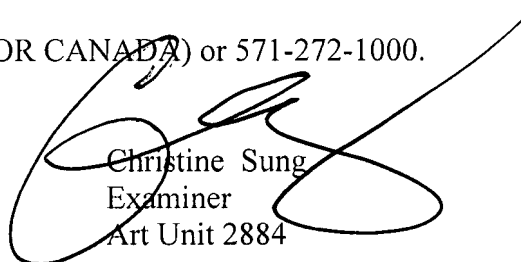
Similarly, regarding claim 11, none of the prior art of record specifies or makes obvious a method of monitoring a flow pipe, namely the step of providing one or more additional sources that comprise at least one pair of non-identical sources positioned on the circumference of said pipe, in combination with the other claimed elements. References such as Hasegawa and Farren disclose methods of determining density using a plurality of sources of the same photon energy but do not disclose or suggest providing a plurality of non-identical sources.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Sung whose telephone number is 571-272-2448. The examiner can normally be reached on Monday- Friday 9-5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on 571-272-2444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Christine Sung
Examiner
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CS